Trend Study 17R-8-05

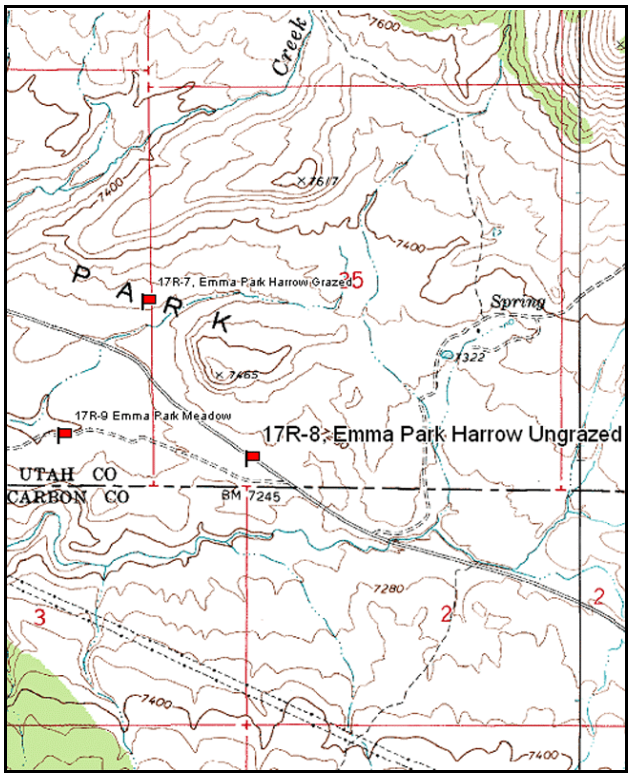
Study site name: Emma Park Harrow-Ungrazed . Vegetation type: Harrowed Big Sagebrush .

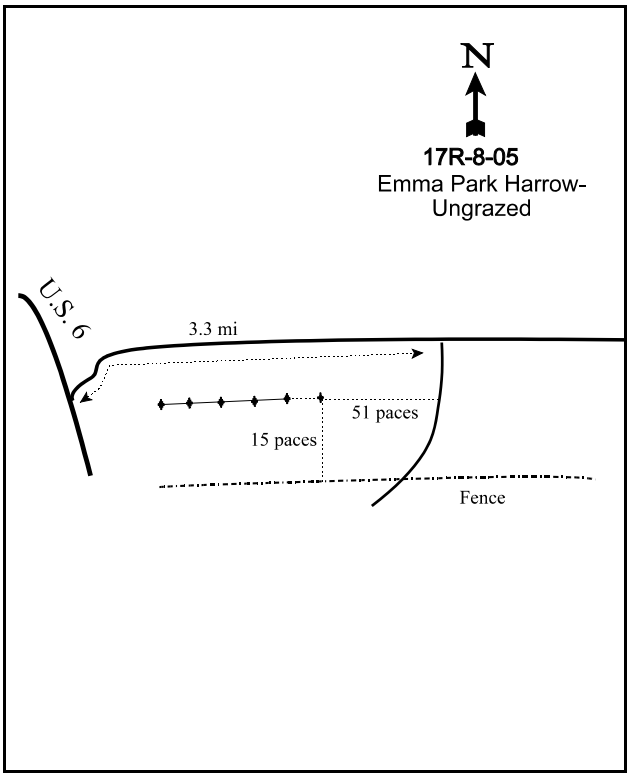
Compass bearing: frequency baseline 298 degrees magnetic.

Frequency belt placement: line 1(11ft), line 2(34 ft), line 3(59 ft), line 4(71 ft), line 5 (95 ft).

LOCATION DESCRIPTION

From the Kyune turnoff on U.S. 6 travel 3.3 miles to a turnoff on the south side of the road. The study site is located between the road and the fence 51 paces west of the turnoff. The 0-foot stake is 15 paces north of the fence. The 0-foot stake is marked by browse tag #425.





Map name: Kyune

Diagrammatic Sketch

Township 11S , Range 9E , Section 35

GPS: NAD 27, UTM 12S 4406912 N, 509391 E

DISCUSSION

Emma Park Harrow Ungrazed - Trend Study No. 17R-8

The Emma Park Harrow Ungrazed study is located about 3½ miles east of the junction of Highway 6 and Kyune in Spanish Fork Canyon. This study was established in 2001 to monitor a sagebrush pipe harrow treatment conducted by the Bureau of Land Management and Utah Division of Wildlife Resources. This area had been pipe harrowed one-way and seeded prior to site placement. This study was paired with study 17R-7 to monitor site differences with and without livestock grazing following a pipe harrow treatment. Cattle grazing is not supposed to occur on this location, but will occur on study 17R-7. Pellet group data from 2001 estimated densities at 12 deer and less than 1 elk days use/acre (30 ddu/ha and 2 edu/ha). No cattle pats were sampled in 2001. Pellet group data from 2005 was estimated at 1 deer, 8 elk, and 1 cow days use/acre (3 ddu/ha, 20 edu/ha, and 2 cdu/ha). Grouse pellets were observed at 122 pellet groups/acre.

The elevation at this study is approximately 7,200 feet with nearly flat terrain. Soils are a clay loam in texture with a soil reaction that is slightly alkaline (7.6 pH). Phosphorus is quite low at 2.9 ppm. Values below 6 ppm may limit normal plant growth and development (Tiedemann and Lopez 2004). Effective rooting depth is estimated at over 17 inches, which is considerably deeper than study 17R-7. A stoniness index determined from penetrometer readings that most of the rock in the profile is 8 to 20 inches below the surface. An erosion condition class assessment determined soils to be stable in 2001, but slight in 2005. Moderate pedestaling around vegetation provides the past evidence of erosion. A few small gullies and rills were added to the pedestaling in 2005.

The dominant browse species is mountain big sagebrush which averaged 13% cover in 2001 and 11% in 2005. Sagebrush density was estimated just over 4,500 plants/acre in 2001 and decreased to 3,760 plants/acre in 2005. Due to the pipe harrow treatment in 2001, sagebrush decadence and poor vigor were understandably high at 42% and 72% respectively. By 2005, the sagebrush population appeared to have stabilized with only 14% decadency and 7% with poor vigor. This is consistent with the data collected at study 17R-7, which underwent the same treatment. Young plant abundance is moderately high at an estimated 560 plants/acre in 2001 and 300 in 2005. Use on sagebrush was light in 2001 and 2005 where annual leader growth averaged about 2 inches both years.

Other browse sampled include stickyleaf low rabbitbrush, snowberry, rubber rabbitbrush, and gray horsebrush. In 2001, the density of low rabbitbrush was nearly 40% higher than study 17R-7. Both studies decreased in abundance for low rabbitbrush by over 30% in 2005. Rubber rabbitbrush density was nearly five times (840 plants/acre) higher in 2001 and three times (740 plants/acre) higher in 2005 on this study than study 17R-7.

The herbaceous understory is not as diverse as study 17R-7. In 2005, 11 grasses and 17 forbs were sampled. Grasses averaged 14% cover in 2001 and 20% in 2005. Forbs averaged only 2% in 2001 and 4% in 2005. Western wheatgrass was sampled in nearly three-fourths of the quadrats and provided 12% average cover in 2001. In 2005, Western wheatgrass was differentiated from Salina wildrye, so 2005 data showed a decrease in western wheatgrass cover. Bluebunch wheatgrass was second in abundance, contributing 2% average cover in 2001 and increased to 7% in 2005. All other grasses were sampled infrequently. Sweet milkvetch and desert phlox were the most abundant forbs in 2005, while annual species were rarely encountered. There was no noticeable utilization on the herbaceous species in 2001 or 2005.

2001 APPARENT TREND ASSESSMENT

Soils appear to be stable. Disturbance from the pipe harrow treatment has increased the amount of bare soil over what would normally occur. Even with the treatment, vegetation and litter cover are adequate and erosion minimal. Browse, primarily mountain big sagebrush, is in a downward condition due to the pipe harrow

treatment. Percent decadence and poor vigor are moderately high at the present time. However, the number of young in the population is good. Percent decadence should decrease and vigor improve after a few growing seasons. Diversity for herbaceous species should improve in the future. Annual species are nearly nonexistent. The Desirable Components Index rated this site as fair with a score of 61 due to moderate shrub cover, high percent decadence on shrubs, and excellent perennial grass cover.

2001 winter range condition (DC Index) - fair (61) Mid-level Potential scale

2005 TREND ASSESSMENT

Soil trend is stable. Vegetation and bare ground nested frequency both increased by 5%, while litter decreased by 7%. The ratio of protective cover (vegetation, litter and cryptogams) to bare ground declined slightly, but appears adequate to protect the soil from erosion. Trend for the key browse mountain big sagebrush is slightly up. Density has decreased due to the pipe harrow treatment, but overall health of the browse is good. Percent decadency decreased from 42% in 2001 to 14% in 2005 and vigor of the plants are good. Trend for the herbaceous understory is slightly up. Nested frequency for bluebunch wheatgrass, mutton bluegrass, and Sandberg bluegrass all increased significantly. Perennial forbs decreased slightly while annuals increased, although both provide very little cover. The Desirable Components Index rated this site as fair to good with a score of 69 due to moderate shrub cover, low percent decadence on shrubs, and excellent perennial grass cover.

TREND ASSESSMENT
soil - stable (0)
browse - slightly up (+1)
herbaceous understory - up (+2)
winter range condition (DC Index) - fair to good (69) Mid level Potential scale

HERBACEOUS TRENDS --
Management unit 17R, Study no: 8

Type	Species	Nested Frequency		Average Cover %	
		'01	'05	'01	'05
G	Agropyron intermedium	3	3	.03	.15
G	Agropyron smithii	b243	a68	12.08	3.02
G	Agropyron spicatum	a53	b104	2.00	7.48
G	Bromus inermis	1	4	.00	.06
G	Carex sp.	2	-	.00	-
G	Elymus salina	a-	b151	-	8.07
G	Koeleria cristata	-	2	-	.06
G	Oryzopsis hymenoides	-	-	-	.00
G	Poa fendleriana	a-	b12	.00	.07
G	Poa pratensis	1	4	.00	.03
G	Poa secunda	a1	b39	.00	1.06
G	Stipa lettermani	10	14	.24	.36
Total for Annual Grasses		0	0	0	0

Type	Species	Nested Frequency		Average Cover %	
		'01	'05	'01	'05
Total for Perennial Grasses		314	401	14.40	20.40
Total for Grasses		314	401	14.40	20.40
F	Achillea millefolium	8	5	.09	.18
F	Arabis sp.	-	3	-	.04
F	Astragalus cicer	$_{b}$25	$_{a}$5	.66	.03
F	Astragalus convallarius	$_{a}$-	$_{b}$9	-	.03
F	Astragalus tenellus	$_{b}$13	$_{a}$-	.21	-
F	Aster sp.	-	10	-	.06
F	Chenopodium leptophyllum(a)	$_{a}$5	$_{b}$22	.00	.04
F	Cirsium sp.	3	2	.00	.03
F	Descurainia pinnata (a)	-	3	-	.03
F	Erigeron sp.	4	-	.01	-
F	Hedysarum boreale	$_{a}$6	$_{b}$35	.21	2.18
F	Lappula occidentalis (a)	-	-	.00	-
F	Lactuca serriola	2	1	.00	.00
F	Linum lewisii	9	3	.01	.03
F	Machaeranthera canescens	2	3	.01	.16
F	Medicago sativa	3	-	.03	-
F	Penstemon caespitosus	$_{b}$31	$_{a}$8	.19	.07
F	Phlox austromontana	34	39	.60	1.13
F	Potentilla gracilis	7	7	.03	.07
F	Sanguisorba minor	6	2	.04	.03
F	Senecio multilobatus	-	2	-	.03
F	Taraxacum officinale	1	-	.00	-
F	Trifolium sp.	2	-	.00	-
Total for Annual Forbs		5	25	0.00	0.07
Total for Perennial Forbs		156	134	2.13	4.11
Total for Forbs		161	159	2.14	4.19

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Management unit 17R, Study no: 8

Type	Species	Strip Frequency '01	Strip Frequency '05	Average Cover % '01	Average Cover % '05
B	Artemisia tridentata vaseyana	77	74	13.20	10.83
B	Chrysothamnus nauseosus	26	24	2.26	2.54
B	Chrysothamnus viscidiflorus viscidiflorus	57	62	3.26	7.40
B	Gutierrezia sarothrae	3	1	.41	-
B	Symphoricarpos oreophilus	1	1	-	.00
B	Tetradymia canescens	1	1	.03	.03
Total for Browse		165	163	19.18	20.81

CANOPY COVER, LINE INTERCEPT --
Management unit 17R, Study no: 8

Species	Percent Cover '05
Artemisia tridentata vaseyana	15.30
Chrysothamnus nauseosus	4.63
Chrysothamnus viscidiflorus viscidiflorus	8.21
Gutierrezia sarothrae	.15
Symphoricarpos oreophilus	.28

KEY BROWSE ANNUAL LEADER GROWTH --
Management unit 17R, Study no: 8

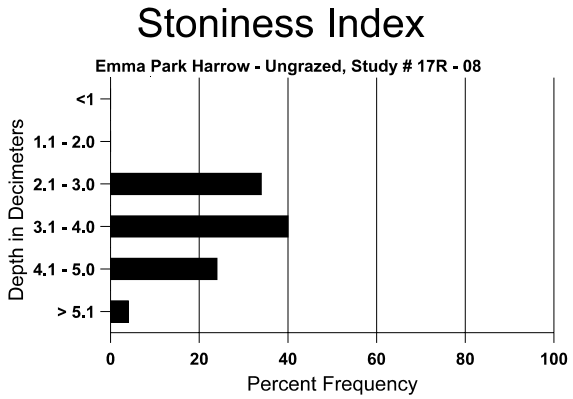
Species	Average leader growth (in) '05
Artemisia tridentata vaseyana	2.2

BASIC COVER --
Management unit 17R, Study no: 8

Cover Type	Average Cover %	
	'01	'05
Vegetation	34.19	43.14
Rock	.02	.01
Pavement	.10	.43
Litter	55.72	38.42
Cryptogams	.85	.37
Bare Ground	28.29	32.29

SOIL ANALYSIS DATA --
Herd Unit 17R, Study no: 08, Emma Park Harrow-Ungrazed

Effective rooting depth (in)	Temp °F (depth)	PH	%sand	%silt	%clay	%0M	ppm P	ppm K	dS/m
17.2	55.8 (18.1)	7.6	33.9	32.4	33.7	2.2	2.9	297.6	0.6



PELLET GROUP DATA --
Management unit 17R, Study no: 8

Type	Quadrat Frequency	
	'01	'05
Rabbit	39	16
Grouse	-	2
Elk	-	5
Deer	5	2
Cattle	-	-

Days use per acre (ha)	
'01	'05
-	-
-	122/acre
1 (2)	8 (20)
12 (30)	1 (3)
-	1 (2)

BROWSE CHARACTERISTICS --
Management unit 17R, Study no: 8

		Age class distribution (plants per acre)					Utilization					
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
Artemisia tridentata vaseyana												
01	**4540**	20	560	2060	1920	540	.44	0	42	9	72	20/24
05	**3760**	340	300	2940	520	1400	0	.53	14	7	7	22/32
Chrysothamnus nauseosus												
01	**840**	-	180	600	60	-	0	0	7	-	5	17/22
05	**740**	-	-	700	40	20	0	0	5	3	3	23/33
Chrysothamnus viscidiflorus viscidiflorus												
01	**6440**	-	180	5820	440	80	0	0	7	1	14	6/9
05	**3980**	-	180	3680	120	20	0	0	3	1	1	8/15
Gutierrezia sarothrae												
01	**180**	-	-	160	20	-	0	0	11	-	0	4/7
05	**40**	-	-	40	-	-	0	0	0	-	0	6/13
Symphoricarpos oreophilus												
01	**40**	-	40	-	-	-	0	0	-	-	0	-/-
05	**20**	-	-	20	-	-	0	0	-	-	0	-/-
Tetradymia canescens												
01	**60**	-	-	-	60	-	0	0	100	-	0	-/-
05	**40**	-	-	40	-	-	100	0	0	-	0	10/12